

Dredging and Navigation Safety

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Report to
Seaport Planning Advisory Committee

by
San Francisco Bay Conservation and Development Commission Staff

Dredging and Navigational Safety

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Dredging and Navigation Safety

Introduction

Sufficiently deep and obstruction free navigation channels and berthing facilities are essential to the development and operation of maritime ports. Ocean-going vessels require shipping lanes of adequate depth and width to safely access shoreside marine terminals. The dilemma that faces ports, maritime shipping, and environmental protection interests is how best to balance the needs of maritime commerce development and operation with the protection and management of aquatic and wildlife resources that are of local, national, and international significance.

San Francisco Bay, one of the world's great natural harbors and a center of ocean-going commerce, affords sheltered harbors for deep water ports and access to an immediate market of over 7.5 million people—the fourth most populated metropolitan area in the country. The Bay system (San Francisco, Suisun, San Pablo, Grizzly, and Honker Bays) is also the largest estuary on the Pacific coast of North America—a highly diverse and productive ecological system. As a natural resource, the Bay—where the cold tidal water of the ocean meets and mixes with the warmer tributary fresh water river systems—provides particularly rich, abundant and diverse habitats for a multitude of aquatic organisms and wildlife and is an essential resting and feeding place for a multitude of migratory fish, waterfowl and shorebirds. The provision of adequately deep navigation channels to Bay ports, and the maintenance of those channels and port ship berths, has and will continue to be balanced with the need to protect the invaluable natural resources of the Bay. The purpose of this report is to briefly describe the existing and likely future port-related dredging projects and activities in the Bay; the existing limitations on the disposal of dredged material in the Bay and why these limits have been established; and likely future dredged material disposal options available, in order that choices and strategies concerning port priority use areas and marine terminal designations can be better made in the update of the *San Francisco Bay Area Seaport Plan*. In addition, the report discusses the apparent navigation safety hazards posed by Harding, Arch, and Shag Rocks, obstructions that lie just below the Bay surface in the shipping lane north of Alcatraz Island.

The Need for Dredging

Approximately 65 percent of precipitation runoff in California flows down the Sacramento and San Joaquin River systems and into the Bay before funneling out the Golden Gate to the Pacific Ocean. Through time, soil particles—silt, sand and clay sediments—eroded from the Sierra Nevada have been washed down the drainage system to the Delta and Bay where they have settled and accumulated on the bottom.¹ As a consequence, the Bay has gradually filled and today is generally shallow—two-thirds of it is less than 18 feet deep and it averages 20 feet deep at low tide. Annually, approximately six million cubic yards (cyd) of sediment—inflowing and resuspended sediment already resident in the Bay—lodges in harbors and navigation channels from which it must be removed to maintain adequate depths for safe navigation. Particularly in an estuary, where there is often little bottom scour, excavated channels normally seek equilibrium with the surrounding bottom level, and consequently fill with sediments until equilibrium is reached. As a result, maintenance dredging is required to keep excavated channels, turning basins, and ship berths at the proper depth for safe navigation and mooring. In addition, channels, basins and berths sometimes require deepening to accommodate newer, larger ships calling on Bay ports. This need is particularly true in the container shipping business where larger ships with deeper drafts are standard to the industry.

¹ Aquatic Habitat Institute and Philip Williams & Associates, *Status and Trends Report on Dredging and Waterway Modification in the San Francisco Estuary*, (Oakland: San Francisco Estuary Project, March 29, 1990), pp. 200-202.

Environmental Effects of Dredging and Disposal of Dredged Material

Past and current waste disposal practices have introduced pollutants into the Bay, some of which have become trapped in and have degraded sediments on the Bay floor. These pollutants are not distributed evenly around the Bay, but are found mainly in areas where industrial, including military, activities have taken place and where wastewater outfalls have been located. Dredging and subsequent disposal of contaminated sediments in the Bay can resuspend and redistribute pollutants in the Bay water column, making them accessible to aquatic organisms and possibly leading to adverse effects on aquatic life.

Pursuant to the federal Clean Water Act (CWA), federal and state dredged material pollutant testing programs have been established to ensure that dredged sediments with unacceptable levels of pollutants will not be disposed in the Bay. These programs are administered by the U.S. Army Corps of Engineers (Corps), the State Water Resources Control Board (State Board), and the state Regional Water Quality Control Boards (Regional Board), with oversight by the U.S. Environmental Protection Agency (EPA). These agencies have established a tiered system of testing to judge pollutant levels in sediments proposed to be dredged from the Bay. As a consequence of the CWA requirements and testing protocols established by the federal and state agencies, polluted materials must be disposed at sites where the pollutants will not enter the Bay.² This action has foreclosed the historical use of the Bay as a disposal area for polluted sediments. Consequently, sites other than the Bay must be found to dispose contaminated dredged sediments.

"Clean," as well as polluted material can have serious environmental consequences on Bay aquatic life. Sediments resuspended in the water column by dredging and disposal in the Bay increases water turbidity. Suspended sediments can physically harm aquatic organisms by abrasion, clogging gill and mouth organs, and causing mortality and stress to organisms during sensitive periods of their lives. Additionally, high turbidity may reduce light penetration and lower the reproductivity of aquatic plants, and, by reducing the sensory abilities of fishes, impair their ability to locate prey and to reproduce. Commercial and sport fishing interests have recently alleged that increased turbidity—which they claim is caused by dredged material disposal—has caused the Bay fishery to decline, not only because of the effects listed above, but by causing schooling fish to disperse, migratory fish to avoid or pass rapidly through the Bay, or by causing fish to stop feeding. Many of the federal (U.S. Fish and Wildlife Service, National Marine Fisheries Service) and state (Department of Fish and Game) resource management agencies have expressed concern about the impact of disposal of dredged material in the Bay on aquatic resources including alteration of benthic and shoreline habitats and turbidity.³ This concern, in part, has led to Bay dredged material volume limits and disposal time periods discussed in the Dredged Material Disposal Management section below.

Dredging Projects

Most dredging in the Bay is carried out by the Corps, the U.S. Navy, and the Bay Area ports. The Corp is charged with constructing and maintaining navigation channels authorized by the Congress. The Navy deepens and maintains approach channels and berths for naval ships that call or are based at Bay naval bases. The Bay Area ports and proprietary terminals—mainly petroleum terminals—undertake dredging to deepen or maintain ship berths around terminal

² Disposal of polluted dredged material that would be "contained" at a site off Bay Farm Island in Alameda is being analyzed by the Corps.

³ U.S. Environmental Protection Agency, *Final Environmental Impact Statement (EIS) for Designation of a Deep Water Ocean Dredged Material Disposal Site off San Francisco, California*, (San Francisco: Region IX, August 1992), pp. 2-20.

docks. In 1992, the most recent year with complete information reported, of the 3,913,690 cyd of material dredged from the Bay, the Corps dredged 1,569,000 cyd or 40 percent; the Navy dredged 1,054,000 cyd or 27 percent; the ports dredged 958,000 or 24 percent; and the remaining 332,690 cyd, or nine percent, was dredged by marinas, proprietary oil terminals, and for small miscellaneous projects.

1. **Corps Projects.** The Corps has the primary responsibility for maintaining the navigable waters of the United States, including developing, improving, and maintaining harbors and navigation channels. The Congress authorizes specific projects for the Corps to carry out, referred to as "Federal" or "Civil Works" projects, and appropriates funds for the improvement activities.⁴ There are seven Congressionally-authorized projects within San Francisco Bay that serve Bay Area ports: Mare Island Strait Channel, Oakland Harbor, Pinole Shoal, Redwood City Harbor, Richmond Harbor, San Francisco Harbor, and the Suisun Bay Channel. These projects are discussed below and shown in Figure 1, which also shows other major dredging projects in the Bay.

a. **Mare Island Strait Project.** The Mare Island Strait channel and turning basin has been dredged by the Corps to a depth of 36 feet. Mare Island Strait lies at the mouth of the Napa River and is subject to relatively high rates of siltation deposited from river flows and sediment resuspension. The Corps' five-year planning average volume for dredging to maintain the channel is approximately 500,000 cyd of sediment. But as with other dredging maintenance projects, the estimated annual dredging need is often overestimated. For example in 1992, the Corps dredged approximately 289,000 cyd of material and disposed of the material at the Carquinez Strait disposal site (see discussion of Dredged Material Disposal Management below and Figure 2 for location of Bay dredged material disposal sites). The reduced amount of dredging for the channel, as well as other project channels, can be attributed to low riverine inflow to the Bay because of the record seven-year drought in California that ended in 1993. In 1993, because of the unusually wet winter and extensive shoaling, 976,415 cyd of sediment was dredged from the channel and disposed at the Carquinez Strait disposal site.

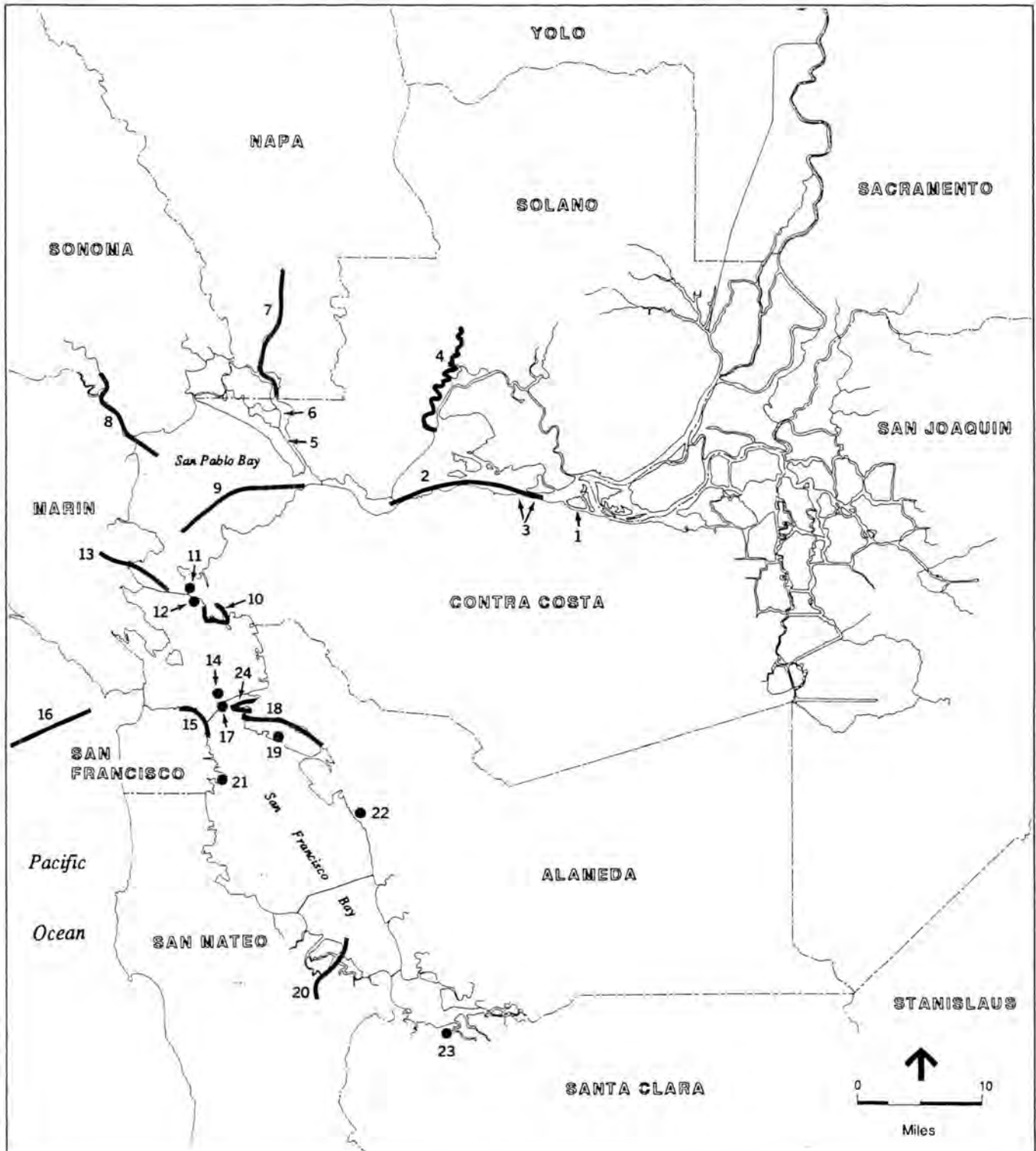
Development of the Mare Island Strait Channel and Turning Basin was justified, in part, to serve water-related industrial uses at the Peter Kiewit, Kaiser Steel, and General Mills properties on the east shoreline of the Strait in the City of Vallejo. However the continued maintenance of the channel for these uses appears unjustified because the General Mills Company, which makes flour on its property, no longer transports its raw materials or its finished flour by ship. Peter Kiewit and Kaiser Steel—sites designated as a port priority use area and marine terminal site in the *Seaport Plan*—formerly used their properties for metal fabrication, including the construction of off-shore oil drilling platforms that were transported by water to ocean drilling sites. Kaiser has sold its property to the City of Vallejo and no longer manufactures materials at the site. Peter Kiewit also no longer manufactures or assembles products at its site. The City of Vallejo has requested deletion of the port priority use area and marine terminal designation from the former Kaiser property and there is no indication that the Kiewit company desires to develop its site as a marine terminal. Because of property owner and local government disinterest in maritime use of the Kaiser and Kiewit site, General Mills' cessation of transporting its products by water, and likely continued federal budget constrictions, it seems there is a little justification in maintaining the channel for deep-draft vessels. Therefore, it would seem reasonable that the federal government would reevaluate the utility of maintaining the Mare Island Strait Channel as an authorized federal project unless some new use that requires deep water shipping is developed along Mare Island Strait.

⁴ Ibid, p. 23.

Figure 1

Major Dredging Areas

- | | | | |
|---------------------------|---------------------|-----------------------------|-----------------------|
| 1 New York Slough | 7 Napa River | 13 San Rafael Creek | 19 Alameda NAS |
| 2 Suisun Bay Channel | 8 Petaluma River | 14 Treasure Island NS | 20 Redwood City |
| 3 Concord NWS | 9 Pinole Shoal | 15 Port of San Francisco | 21 Hunters Point NSY |
| 4 Suisun (Slough) Channel | 10 Richmond Harbor | 16 San Francisco Bar | 22 San Leandro Marina |
| 5 Mare Island Strait | 11 Point Molate NFD | 17 USCG, Yerba Buena Island | 23 Moffett Field NAS |
| 6 Mare Island NSY | 12 Chevron | 18 Oakland Harbor | 24 Oakland NSC |



Although not a Congressionally-authorized project, adjacent and just west of the Mare Island Strait Channel, within Mare Island Strait, is a 36-foot deep Navy channel that provides access to the Mare Island Naval Shipyard. The Corps maintains the channel for the Navy and plans on annually dredging close to one million cyd of sediment from the channel and the naval facility ship berths to maintain adequate water depth. The dredged material is hydraulically pumped across the Island to disposal ponds on the Island's west side. Although the Navy did not report any maintenance dredging in 1992, maintenance dredging did take place in 1993 but the volume dredged was unavailable at the time of preparation of this report.

The Mare Island Naval Shipyard is scheduled to close in 1996 and the Corps can not be expected to maintain the Navy channel after closure.⁵ Any future port use of Mare Island would depend on either continued federal maintenance of the Navy Channel or the continuance of the Mare Island Strait Channel project. Without federal dredging, the cost of maintaining a channel of a depth sufficient for ocean-going ships would be extremely expensive to the local operator of a port facility at either Mare Island or the Kaiser/Kiewit site.

b. **Oakland Harbor Project.** The Oakland Harbor Project consists of the Oakland Inner Harbor Channel and the Oakland Outer Harbor Channel. The Outer Harbor Channel is authorized to a depth of 35 feet and provides deep-draft container ship access to the northern side of the Port of Oakland's Seventh Street Terminals and to the Outer Harbor Terminals. The Port of Oakland however, maintains the center portion of the channel at its existing depth of 38 feet to allow deeper draft container ships to berth at the terminals in that area of the Outer Harbor.

The Inner Harbor Channel, which provides access to the Oakland Naval Supply Center and the Port of Oakland's Middle and Inner Harbor container and neo-bulk terminals, was deepened to 38 feet in 1992 to the Howard Terminal located just west of Jack London Square. The Channel is maintained to a depth of 35 feet deep beyond the Howard Terminal to the Channel terminus at the Ninth Avenue Terminal across from Coast Guard Island. However, the Port of Oakland, as local sponsor, is completing an application to widen and deepen the Outer and Inner Harbor Channels to 42 feet to enable larger container ships to call at the Outer and Middle Harbor terminals. In addition, the Port is proposing to construct a new turning basin, also to a depth of 42 feet. Because of the constraints posed by the Alameda Tube under the Inner Harbor Channel, the Channel would not be deepened beyond the Howard Street Terminal and would remain at its current depth of 35 feet.

The deepening and widening project will require the excavation of approximately five million cyd of material which is proposed to be disposed at the ocean disposal site and at upland sites (Sonoma Baylands and Galbraith Golf Course) (see discussion concerning Dredged Material Disposal Alternatives below). It is likely that additional deepening of the two channels—to at least 45 feet—will be required in the future to permit access of larger, deeper draft container ships to call at the Port of Oakland's container terminals.

The Oakland Inner and Outer Harbor Channels normally require annual maintenance dredging of approximately 400,000 cyd of sediment. Continued maintenance of the deepened channels and turning basins will likely require additional annual maintenance dredging. However, in 1992 the Corps reported dredging only 25,000 cyd of sediment to maintain the channels. The dredged material was disposed at the Alcatraz disposal site.

⁵ Tom Wakeman, personnel communication.

c. **Pinole Shoal Project.** The eight-mile-long Pinole Shoal Channel, located in San Pablo Bay, is maintained by the Corps to a depth of 36 feet. Congress has authorized the channel to be deepened to 45 feet and lengthen to 11 miles as part of the John F. Baldwin Ship Channel Project that provides access to the Port of Benicia, the proprietary petroleum terminals in western and northern Contra Costa County and at the Port of Benicia, the Mare Island Naval Shipyard and Mare Island Strait Channel, and the Ports of Stockton and Sacramento.

The project, which is scheduled to commence in 1997, will require the dredging of approximately nine million cyd of sediment with disposal planned for the new ocean disposal site (see discussion concerning Dredged Material and Disposal Management below). Annual maintenance dredging of the existing channel is around 500,000 cyd of material. No material was reported dredged from the channel in 1992, however 176,000 million cyd of sediment was dredged in 1993 and disposed at the San Pablo Bay disposal site. With completion of the planned deepening project, annual maintenance amounts can be expected to increase, likely considerably. Historically, maintenance dredging from the channel has been disposed at the San Pablo Bay disposal site.

d. **Redwood City Harbor Project.** The Redwood City Harbor Project consists of two 30-foot navigation channels maintained by the Corps: the San Bruno Shoal channel and the Redwood Creek channel. Two turning basins are also part of the harbor project. The channels provide access from the central Bay to the Port of Redwood City and the Cargill Company's Leslie Salt proprietary terminal. Approximately 800,000 cyd of material is scheduled to be dredged every five years to maintain both channels. In 1992, 251,000 cyd of material was dredged and in 1993, 309,000 cyd of sediment was dredged from the channels and the material was disposed at the Alcatraz disposal site.

e. **Richmond Harbor Project.** The Richmond Harbor Project has two segments: the Outer Harbor and Inner Harbor. The Outer Harbor includes the 45-foot-deep Southampton Shoal Channel and Richmond Long Wharf (Chevron USA Company) maneuvering area. The Inner Harbor portion consists of three parts: (1) the 35-foot deep entrance channel, which extends from the Long Wharf maneuvering area to the Inner Harbor channel; (2) the 35-foot-deep Inner Harbor channel which leads to the Santa Fe Channel; and (3) the 35-foot-deep Santa Fe channel which terminates at a 30-foot-deep turning basin at the head of the channel.

The Richmond Harbor Project provides access to the Port of Richmond and the Chevron USA Company's proprietary Richmond Long Wharf petroleum terminal. The Corps estimates that it must annually dredge approximately 900,000 cyd of material to maintain the project channels. In 1992, approximately 379,000 cyd of material was dredged from the channels, maneuvering area, and turning basin and disposed at the Alcatraz disposal site. In 1993, 314,000 cyd of sediment was dredged at the project site and disposed at Alcatraz.

f. **San Francisco Harbor Project.** The San Francisco Harbor project consists of the San Francisco Bar Channel located outside the Bay five miles west of the Golden Gate, and the Islais Creek Channel off the San Francisco central waterfront. The 55-foot-deep Bar channel is the limiting factor on the size of ships that can access San Francisco Bay. The Corps estimates that it must annually dredge 900,000 cyd of sediment to maintain the channel's authorized depth. In 1992, 440,000 cyd of sediment was dredged from the Bar channel and disposed at Ocean Site 102 and in 1993, approximately 312,000 cyd of material was dredged and disposed at Ocean Site 102.

The Islais Creek Channel, which is the approach channel to the Port of San Francisco's Piers 80 and 96/94—the Port's container terminals—is infrequently dredged because of existing deep water and tidal scour. The channel was not dredged in 1992 or 1993.

g. **Suisun Bay Channel.** The Suisun Bay Channel consists of two parts: (1) a main channel 35 feet deep extending from Bulls Head Point in Contra Costa County at the Benicia-Martinez Bridge to the Mouth of New York Slough in Contra Costa County at the west end of the Delta, and (2) a channel 20 feet deep south of Seal Islands that extends from the main channel at Point Edith in Contra Costa County to the Main channel at Port Chicago. The main channel provides access to the Ports of Stockton and Sacramento and some northern Contra Costa County proprietary oil terminals. The second channel, which branches off the main channel, serves the Concord Naval Weapons Station. The Corps plans on annually dredging approximately 200,000 cyd of sediment to maintain the main channel, while the subsidiary channel is infrequently dredged. In 1992, the Corps dredged 55,000 cyd of sediments from the main channel—mostly sand—and disposed of the material at the Suisun Bay disposal site. In 1993, the Corps dredged 45,000 cyd of material from the channel and disposed of the material at the Suisun Bay site.

2. **Military Projects.** Bay Area Navy bases also required dredging of approach channels, turning basins, and ship berths so they are accessible to a range of naval vessels that call at these facilities. Dredging takes place at the Alameda Naval Air Station, the Oakland Naval Supply Center, Mare Island Naval Shipyard, Pt. Molate Naval Supply Center, Treasure Island Naval Base, and Moffett Field Naval Air Station.

In 1992, the Navy dredged 900,000 cyd of sediment from the Alameda Naval Air Station to maintain sufficient ship berth depths. The excavated sediment was disposed in the deep ocean (Site 103) that is solely used by the Navy. Normally, the Navy plans on annually dredging 900,000 cyd of sediment at the Air Station to maintain proper water depths. In 1993, the Navy dredged 45,920 cyd of material to deepen the approach channel and disposed the material at its deep ocean disposal site.

As discussed in the previous section regarding the Mare Island Strait Project, the Corps maintains the Navy access channel to the Mare Island Naval Shipyard. Maintenance dredging in this channel is annually estimated to be around one million cyd, however no dredging took place in 1992 and the information on the amount of dredging that occurred in 1993 is not yet available.

The Oakland Naval Supply Center plans on dredging approximately 850,000 cyd of sediment annually to maintain adequate water depths at the facility. In 1992 the Navy did not conduct any maintenance dredging, however in 1993 it dredged 166,900 cyd of sediment and disposed the material at the Navy's deep ocean site.

At Pt. Molate, the Navy plans on dredging approximately 150,000 cyd of material annually to maintain proper water depths at the fuel supply facility. In 1992, the Navy dredged 152,000 cyd of sediment and disposed of the material at the Alcatraz disposal site. Information on 1993 maintenance dredging is not yet available.

At Treasure Island the Navy plans to annually dredge 400,000 cyd of sediment, however no dredging was reported in either 1992 or 1993 and with closure of the military facility the need for future dredging is unlikely.

Although the channel to the Moffett Field Naval Air Station in Santa Clara County is infrequently dredged, the Navy dredged 2,000 cyd of sediment in 1992 to maintain access to the facility. The Navy is scheduled to turn the Air Station over to the National Aeronautics and Space Administration (NASA) and if NASA elects to keep the access channel open, the amount of material that would require dredging would be insignificant.

3. Port Facility Maintenance. In addition to deepening, widening, and maintaining navigation channels and turning basins that provided access to port terminals, the individual ports and the proprietary terminals routinely dredge their facilities to maintain proper water depths at marine terminal ship berths.

In 1992, the Port of San Francisco dredged 51,000 cyd of sediment to maintain its ship berths, disposing the material at the Alcatraz disposal site. In addition, Southwest Marine Company, a ship repair firm operating at the Port of San Francisco, dredged an additional 89,000 cyd of sediment and disposed of the material at the Alcatraz disposal site.

The Port of Oakland, in 1992, dredged 156,000 cyd of material to maintain proper depths at its terminals, disposing 136,000 cyd of the sediment that met aquatic disposal standards at the Alcatraz site and 20,000 cyd of polluted sediment at an upland location. In addition, the Port dredged 100,000 cyd of sediment to deepen berth 30 located at the Outer Harbor Terminals and Berth 35 located at the Seventh Street Terminals. Of this amount, 20,000 cyd of sediment was disposed at Alcatraz and 80,000 cyd, which did not meet aquatic disposal standards, at an upland site. A portion of the material disposed upland was used as construction fill for work at Berth 30. In 1993, The Port of Oakland reported 7,000 cyd of material dredged to maintain adequate depths at its ship berths. The dredged material was disposed at Alcatraz.

In 1992 the Port of Benicia dredged 45,000 cyd of sediment to maintain sufficient water depth at its terminal and disposed of the material at the Carquinez disposal site. In addition, the Exxon Corporation dredged 40,000 cyd of material from its terminal at the Port of Benicia, disposing the material at the Carquinez site.

The Regulation of Dredging and the Disposal of Dredged Material

Dredging and the disposal of dredged material in San Francisco Bay is regulated at the federal level by the Corps and the EPA, and at the state level by the State and Regional Boards, the San Francisco Bay Conservation and Development Commission (BCDC), and the State Lands Commission.

1. Federal Agencies

a. U. S. Army Corps of Engineers. In addition to its responsibility of maintaining the nation's navigable waters, the Corps has the duty, under Sections 9 and 10 of the River and Harbor Act of 1899, to regulate, through a permit system, dredging and other work in the waters of the United States. The National Environmental Policy Act (NEPA) requires that the Corps conduct an assessment of the environmental effects of a proposed dredging project and prepare an Environmental Impact Statement (EIS) on the project if the assessment indicates that the proposed project would have a significant impact on the environment.

In 1972, Section 404 of the CWA—the central law in the federal water pollution control program—granted the Corps authority to issue permits for the discharge of dredged material into inland and near-coastal waters of the United States. Under the CWA, project applicants are required to satisfy conditions intended to prevent adverse impacts on the aquatic environment. The Corps' own dredging projects must meet the same tests established by the CWA as Corps permit applicants and, moreover, pursuant to the CWA, the Corps' dredging projects are subject to certification by the State Board.

Pursuant to Section 103 of the Marine Protection, Research, and Sanctuaries Act of 1972 (Ocean Dumping Act), the Corps has authority over the transportation of dredged material

to be disposed into coastal waters and the ocean and must review the environmental effects of the proposed activity.^{6, 7}

Other federal and state agencies, as well as private organizations and individuals, play an important role in the Corps' permit decision process. The Corps receives comments from other agencies and the public through its Public Notice process, and after receiving and reviewing the input, the District Engineer determines whether or not to permit the proposed dredging, transportation, and disposal work. If a permit is to be issued, the District Engineer also determines what, if any, conditions to apply to the permitted work.

b. U.S. Environmental Protection Agency. Under the CWA and the Ocean Dumping Act, the EPA has a significant role to play in the regulation of dredging and disposal of dredged materials in the waters of the United States. Section 404 of the CWA directs the EPA to undertake actions similar to the Corps concerning dredging in estuaries and inland waters, and specifically to review and comment on Corps Public Notices regarding proposed dredging activities. If the EPA determines that the disposal of dredged material at a Corps designated disposal site may have unacceptable environmental effects on the environment, it may prohibit or restrict use of the site.⁸

Under the Ocean Dumping Act, the EPA has the responsibility to designate ocean sites for the disposal of dredged materials. As mentioned in a discussion of the Long Term Management Strategy below, in August 1993 the EPA completed its final EIS on alternative deep ocean disposal sites for the disposal of materials dredged from the Bay. The EPA is expected to announce its designated site in May 1994.

Pursuant to Section 102 of the Ocean Dumping Act, the EPA is required to manage its chosen ocean disposal site, review Corps permit applications and comment on the consistency of the proposed disposal with the provisions of the Ocean Dumping Disposal Act, and to cooperate with the Corps in developing environmental criteria to evaluate the impacts of proposed dredged materials on the environment of the ocean site(s).

c. U.S. Fish and Wildlife Service. Under the federal Fish and Wildlife Coordination Act of 1958, the USFWS must be consulted on the impacts on fish and wildlife resources for all federally funded, licensed, or permitted projects. Such activities include dredging and dredged material disposal. Under the federal Endangered Species Act, the USFWS has authority to control activities that may adversely affect habitat of threatened or endangered species. In addition, under the CWA, Ocean Dumping Act, and NEPA, the USFWS has authority to review and comment on all federal projects, including dredged material disposal, and follow guidelines it has established and published in the Federal Register. The Corps gives great credence to the comments of the USFWS in making its permit decisions.

d. National Marine Fisheries Service. Another important federal resource agency that participates in Bay dredging matters is the National Marine Fisheries Service (NMFS). Under the CWA and the federal Fish and Wildlife Coordination Act, the NMFS reviews projects that may affect marine, estuarine, and anadromous fisheries. The NMFS advises the Corps in the Corps' Public Notice process on the likely effects of the proposed dredging or dredged material disposal on the fishery and where the effect is likely to be adverse, will recommend either to deny the permit or recommend ways to mitigate the adverse effects.

⁶ Ibid, pp. 15-16.

⁷ San Francisco Bay Conservation and Development Commission staff. *Water Quality in San Francisco Bay*, (San Francisco: San Francisco Bay Conservation and Development Commission, January 1987), pp. 61-74.

⁸ Aquatic Habitat Institute and Philip Williams & Associates. *Status and Trends Report on Dredging and Waterway Modification in the San Francisco Estuary*, (Oakland: San Francisco Estuary Project, March 29, 1990), pp. 15-16.

2. State Agencies

a. **Regional Water Quality Control Board.** The State Board and its nine California Regional Water Quality Control Boards help carry out the federal CWA and the state Porter-Cologne Act. In San Francisco Bay, the California Regional Water Quality Control Board, San Francisco Bay Region (Regional Board) is the principal agency that administers the State's responsibilities under the CWA and the Porter-Cologne Act. The Regional Board's jurisdiction encompasses the entire hydrologic drainage, or basin, of the Bay to the Delta. Under the Porter-Cologne Act, the Regional Board issues waste discharge control permits and pursuant to the CWA, it issues National Pollutant Discharge Elimination System (NPDES) permits. These two permit systems are the principal means by which the Regional Board carries out its water pollution control policy plan, the *San Francisco Bay Basin Water Quality Control Plan (Basin Plan)*.

In regard to dredging and the disposal of dredged materials in navigable waters of the San Francisco Bay Basin, pursuant to Section 401 of the CWA, a Water Quality Certification is required from the State Board for every federal license or permit including activities regulated by the Corps under Section 404 of the CWA. Moreover, the Corps cannot issue Section 404 permits without the project receiving certification from the State Board. As discussed above, pursuant to the CWA, the Corps too must receive a certification from the State Board for its dredging and dredged material disposal activities.

b. **San Francisco Bay Conservation and Development Commission.** The BCDC has permit authority under the state McAteer-Petris Act over the tidal waters of San Francisco Bay, certain tributary waterways, diked managed wetlands and salt ponds, and a 100-foot-wide shoreline band of land around the Bay. Any person or agency wishing to place fill, extract materials, or change the use of any water, land or structure within its jurisdiction requires a permit from the Commission. The Commission is guided in its permit decisions by the provisions of the McAteer-Petris Act and the policies of its *San Francisco Bay Plan*.

Pursuant to the federal Coastal Zone Management Act of 1972, as amended (CZMA), the management program for San Francisco Bay has been certified by the federal Department of Commerce as the San Francisco Bay segment of the California coastal management program. Accordingly, under the CZMA any federal project in the BCDC's jurisdiction, or likely to effect the Bay coastal zone, must be consistent to the "maximum extent practicable" with the BCDC Bay management program. Moreover, any other project involving land or water uses in the Bay coastal zone that requires a federal permit, license, or other authorization, or that is supported by federal funding assistance, must be "fully consistent" with the BCDC management program for the Bay. Federal dredging projects are subject to the CZMA consistency process and BCDC must concur with a consistency determination made by a federal agency for the project to proceed, although the federal agency may proceed with the project even though BCDC should object if the federal agency finds that the proposed project is "consistent to the maximum extent practicable." The BCDC can appeal that decision to the courts or can request the Secretary of Commerce to mediate its dispute with the Corps. Projects that require federal approval or involve federal financing may not proceed, however, if BCDC objects to a consistency certification. The project sponsor can appeal BCDC's objection to the Secretary of Commerce. If the Secretary finds that the activity would be consistent with the objectives of the CZMA, or is necessary for national security, the Secretary can authorize the project despite BCDC's objection.

BCDC's permit and consistency determinations are guided by the *Bay Plan* policies covering dredging and natural resource matters and the provisions of the McAteer-Petris Act. It coordinates closely with the Regional Board, EPA, and the Corps on dredging matters and requires that all dredging and disposal projects be consistent with the water quality standards set by the State and Regional Boards.

c. **State Lands Commission.** The State Lands Commission has the responsibility for administering the public trust easement over state tide and submerged lands for use for navigation, commerce, fisheries, recreation, and ecological study and preservation. Authorization from the State Lands Commission is necessary for dredging and the disposal of dredged material on lands subject to State Lands Commission authority. Where the material to be dredged is of commercial value, e.g., sand, a mineral extraction lease is required. All other dredging and disposal activities require a permit from the State Lands Commission.

Bay Dredged Material Disposal Management

Historically, material dredged from San Francisco Bay has been deposited back in the Bay, normally as near to the dredging project as possible. However, in 1972, the Corps instituted restrictions on where materials dredged from the Bay could be disposed in the Bay. The Corps designated six sites: Alcatraz, San Pablo Bay, Carquinez Strait, Suisun Bay, Hunters Point, and South Bay (just north of the San Mateo Bridge). In 1978, the Corps further reduced the number of Bay disposal sites to four, eliminating the Hunters Point and South Bay disposal sites and retaining the other sites. The Corps believed that sediments disposed at these sites would easily disperse and not accumulate. Further, the Corps restricted the Suisun Bay site to the disposal of sandy material that it dredged from the Suisun Bay Channel Project. These four sites remain as the sole authorized Bay dredged material disposal sites.

In recent years, most of the sediment dredged from San Francisco Bay has been disposed at the Alcatraz site. The Alcatraz site was chosen because it was located close to the mouth of the Bay where the tidal currents are strong and where the maximum amount of material disposed, it was believed, would be dispersed and swept out the Golden Gate on the ebb tide. In addition, the Alcatraz site was close to major Bay dredging projects. The San Pablo and Carquinez sites were chosen because they were near dredging projects in the north Bay and were located in deeper water with currents that would disperse the disposed material.

From 1986, when reliable records were first kept, until now, between 1.2 to 5 million cyd of sediment has been annually disposed at the Alcatraz site.⁹ In 1992, of the approximately four million cubic yards of material reported dredged from the Bay, approximately 2.75 million cubic yards—69 percent—was disposed at the Alcatraz site.¹⁰

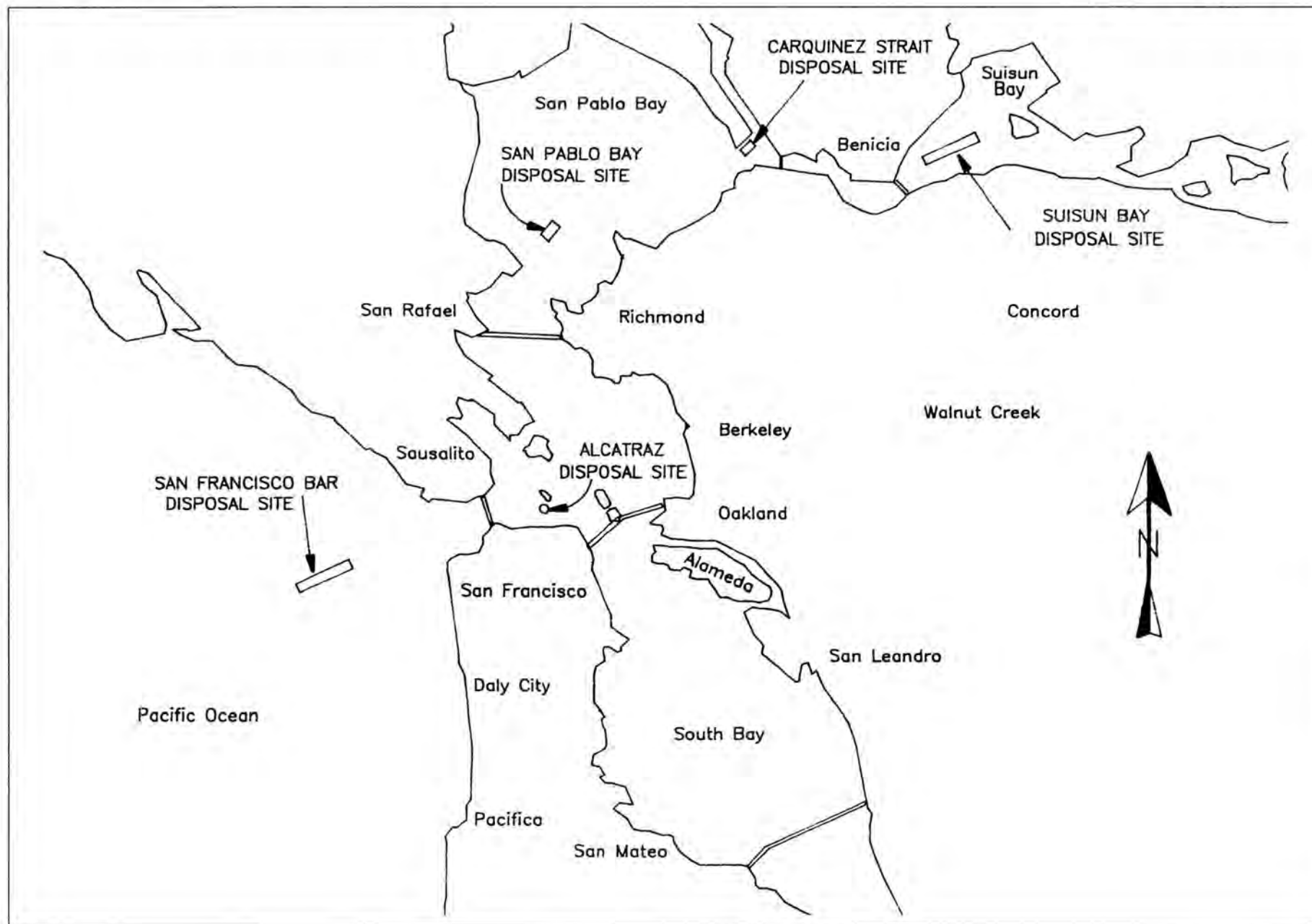
In 1982, it was discovered that not all the material disposed at the 72-acre, 120-foot-deep Alcatraz site was dispersing. In fact, the disposed material had accumulated at the site forming a significant mound on the Bay floor that reached to within 28 feet of the Bay surface. The mound presented a hazard to navigation, altered tidal currents, and likely harmed Bay aquatic organisms. Several reasons were advanced as to why the disposed dredged material had accumulated at the site: (1) the sheer volume of material disposed; (2) the different kinds of material including

⁹ U.S. Environmental Protection Agency, *Final Environmental Impact Statement (EIS) for Designation of a Deep Water Ocean Dredged Material Disposal Site off San Francisco, California*, (San Francisco: Region IX, August 1993), pp. 2-17 to 2-21.

¹⁰ San Francisco Bay Conservation and Development Commission and U.S. Army Corps of Engineers, *Dredging and Disposal Road Map*, (San Francisco: San Francisco Bay Conservation and Development Commission, August 1993).

Figure 2

Bay Aquatic Disposal Sites



heavy consolidated clays; and (3) the possible reduction in tidal current velocities at the site.¹¹ Since the mound was discovered, the Corps has taken a number of steps to minimize material accumulation at the Alcatraz site. It has: (1) excavated the peaks of the mound to a depth that should ensure safe navigation; (2) required that dredged material be disposed in an unconsolidated, or slurry, form; (3) required that the dredged material be disposed more evenly around the disposal site rather than at one or two points; and (4) required dredgers to submit records of the amount of material disposed to enable the Corps and other regulatory agencies to track the annual total amount of material disposed at the site.

In 1990, concerned with the findings of the Corps on the condition of the Alcatraz disposal site and allegations of adverse impact of disposed sediment on Bay aquatic life, the Regional Board instituted additional controls on the amount of material that could be disposed in the Bay and the time of year that dredging and the disposal of dredged material could occur. The Regional Board set the following annual dredged material volume and time limits for the four Bay disposal sites:

- Alcatraz Island—four million cyd annually; with a one million cyd monthly maximum during the months of October through April and 0.3 million cyd monthly maximum during the months May through September.
- San Pablo Bay—0.5 million cyd annually and in any one month.
- Carquinez Strait—three million cyd in a wet or above normal water flow year as those years are classified by the Department of Water Resources, and two million cyd in all other year classifications. One million cyd maximum in any one month.
- Suisun Bay Channel—0.2 million cyd annually for Corps' maintenance dredging projects.

The Regional Board will allow an exception to the above targets for small projects in which: (1) the public benefits of the project clearly exceed any public detriment from the disposal of the additional material in the Bay; (2) the project design depth does not exceed minus 12 feet Mean Lower Low Water (MLLW); and (3) the amount of material to be disposed does not exceed 20,000 cyd in one year nor over 50,000 cyd over five years.

Soon thereafter, the NMFS adopted the same volume and time constraints as the Regional Board as guidelines for use in its comments to the Corps on proposed Bay dredging projects.

In 1992, BCDC amended its *San Francisco Bay Plan* dredging policies and its dredging regulations to include the same volume limits and disposal schedule adopted by the Regional Board and NMFS. Consequently, at this date, there is uniformity among the primary public agencies that control dredging. These rules, however, are intended to serve as interim measures until the final recommendations for Bay dredging and disposal are completed by the Long Term Management Study (LTMS).

But these interim controls may be further narrowed. The Corps has recently proposed changes to its Alcatraz disposal site management program that would further reduce the maximum 30-day target volumes of dredged materials from one to 0.4 million cyd of material during the period October through April and limit the volumes of material excavated by clamshell

¹¹ San Francisco Bay Conservation and Development Commission, *Status of Bay Dredging*, (San Francisco: San Francisco Bay Conservation and Development Commission, November 1988), p. 4.

dredge (normally heavy, consolidated clays) to 0.15 million cyd of material.¹² The Corps proposed these changes because it determined that its current management practices at the Alcatraz site have been inadequate to maintain the site for long-term dredge material disposal use.¹³

Dredged Material Disposal Alternatives

Considerably less than the approximately eight million cyd of sediment normally planned to be dredged from San Francisco Bay each year has been dredged over the last two years.¹⁴ In 1992, approximately 3.9 million cyd of material was dredged from the Bay. However if the volume forecast for future dredging comes close to the projected dredging demand, the volume of material would exceed the limits on disposal set by federal and state dredging regulatory agencies. Consequently, alternate disposal sites must be found or curtailment of Bay dredging is a likely consequence.¹⁵

In 1990, the Corps initiated the LTMS primarily to address the need for location of alternative disposal sites for Bay dredged material. The LTMS is a consensus-based multiple federal and state agency initiative to comprehensively study Bay dredging issues. The purpose of the LTMS is to develop, by 1995, a long-range dredging and dredged material disposal management plan and implementation program. When completed, the LTMS is expected to provide the basis for uniform and predictable federal and state dredged material disposal policies and regulations. There are three distinct, but interrelated, elements in the LTMS planning underway—the uplands (areas not within the tidal waters of the Bay or ocean, but including diked wetlands and salt ponds diked from the Bay), ocean, and Bay study elements. The BCDC is responsible for the uplands studies, the Regional Board the Bay studies, the EPA the ocean studies, and the Corps is responsible for overall LTMS management.

The purpose of the upland studies element is to find sites and methods to use dredged material beneficially and to locate capacity for the accommodation of polluted sediments. It has been demonstrated that dredged material can be used in restoring and enhancing tidal and managed wetlands; construction and repair of levees; use as cover or as a sealant on solid waste facilities and sanitary landfills; and fill material in construction projects. The use of dredged material has been proven successful in use for cover material at the Redwood Landfill near Novato in Marin County; for levee repair and maintenance on Sherman and Twitchell Islands in the Delta; as engineered fill at the Port of Oakland's Berth 30; and for tidal marsh restoration at the Muzzi Marsh in Greenbrae, Marin County, the Faber Tract in East Palo Alto, San Mateo County, and Salt Pond No. 3 in Alameda County. The beneficial use of dredged materials provides a promising, positive alternative for disposing of materials dredged from the Bay. However, an analysis of 13 demonstration projects conducted by BCDC indicates that there are obstacles to the upland use of dredged materials, primarily: (1) the high relative cost of upland disposal;¹⁶ (2) regulatory

¹² U.S. Environmental Protection Agency, *Final Environmental Impact Statement (EIS) for Designation of a Deep Water Ocean Dredged Material Disposal Site off San Francisco, California*, pp. 2-20.

¹³ Ibid.

¹⁴ The reduction in the volume of maintenance dredging in the past few years can be attributed to the reduction in riverine inflows to the Bay as a result of the seven-year drought in California. As sediment carrying flows are reduced, the volume of dredging required to maintain navigation channels is correspondingly reduced.

¹⁵ In 1992, 10,911,000 million cyd material was projected to be dredged from the Bay, however approximately 3,914,000 million cyd was actually dredged. In 1993, 11,216,700 cyd of material was planned to be dredged from the Bay, but by mid-year only approximately 1,458,400 cyd had been reported dredged. In 1994, 22,400,000 cyd of material is projected to be dredged from the Bay, much of which would come from proposed channel deepening projects. See San Francisco Bay Conservation and Development Commission and U.S. Army Corps of Engineers. *Dredging and Disposal Road Map*.

¹⁶ Historically, the monetary cost of disposal of dredged materials in the Bay has ranged from three to six dollars per cyd. The cost of upland disposal ranges from the cost of Bay disposal to over \$30 per cyd depending on the

agency concern with possible human and environmental health risks posed by pollutants in dredged material; (3) regulatory agency concern with the impacts on existing upland wildlife habitats, particularly on seasonal wetlands; and (4) little coordination by some regulatory agencies in processing dredging permits and instituting a clear agency policy in support of upland disposal.¹⁷

The EPA's ocean study has concentrated on designating an environmentally acceptable deep-water ocean disposal site for the long-term disposal of Bay dredged material. Before disposal at the selected ocean disposal site may occur however, the project proponent will be required to show that there is need to dispose in the ocean and the material to be disposed is acceptable pursuant to the environmental criteria and regulations set by the EPA and the Corps.¹⁸ In August 1993, the EPA released its final Environmental Impact Statement for its preferred ocean site, referred to as Alternate Site 5, located 50 nautical miles off shore of the Golden Gate beyond the Gulf of the Farallones National Marine Sanctuary in water ranging from 8,200 feet to 9,840 feet deep. As with upland disposal, ocean disposal can be significantly more costly than disposal in the Bay. Although the exact cost of disposal at Alternative Site 5 is unknown, it is estimated that the cost will range between five and 20 dollars per cyd. The EPA is scheduled to designate its ocean disposal site in May 1994.

Because our understanding of how sediments disposed in the Bay disperse and effect Bay aquatic life is limited, the Regional Board's Bay disposal studies are intended to: (1) provide a better understanding of sediment movement in the Bay; and (2) establish a threshold measurement level to determine when sediments will be considered too polluted to be disposed in the Bay. The Regional Board's studies seek to provide scientists, resource and regulatory agencies, and others with a better understanding of Bay sediment dynamics and environmental effects. Further, the studies are intended to provide better information to enable the regulatory agencies to set a more quantifiable, objective standard to measure the pollutant level of dredged material and determine the acceptability of disposal of the material in aquatic environments.

Navigation Obstacles

In 1990, the California Legislature enacted the Oil Spill Prevention and Response Act (OSPRA) to improve the prevention, removal, abatement, response containment, clean-up, and mitigation of oil spills in the marine waters of California. The OSPRA creates harbor safety committees for the major state harbors and charges the committees with preparing a harbor safety plan for the safe navigation of all vessels within the harbor. The Harbor Safety Committee for the San Francisco Bay Region was formed in September 1991 and in August 1992 adopted its *San Francisco, San Pablo and Suisun Bays Harbor Safety Plan*, and updated the *Plan* in September 1993. Although the *Harbor Safety Plan* is directed primarily at the reduction in risk of oil spills occurring in the Bay, the recommendations in the *Plan* concerning ship navigation safety are applicable to cargo carrying ships that call at the Bay Area ports.

The Harbor Safety Committee has identified what it believes is a major navigation hazard in the ship navigation lane northwest of Alcatraz Island. Harding, Arch and Shag Rocks, three large

location and scale of the dredging and the beneficial use project. San Francisco Bay Conservation and Development Commission. Draft untitled report to the U. S. Environmental Protection Agency evaluating 13 upland disposal demonstration projects in the San Francisco Bay and Delta Estuary. January 1994.

¹⁷ Based on an evaluation of 13 upland disposal demonstration projects in the San Francisco Bay and Delta Estuary conducted by the San Francisco Bay Conservation and Development Commission, staff for a report to the U. S. Environmental Protection Agency to be completed in February 1994.

¹⁸ U.S. Environmental Protection Agency, *Final Environmental Impact Statement (EIS) for Designation of a Deep Water Ocean Dredged Material Disposal Site off San Francisco, California*, (San Francisco: Region IX, August 1993), p. v.

rock formations that extend from the floor of the Bay to within 33 feet and 36 feet of the Bay surface are located within the outbound ship navigation lane which passes north of Alcatraz Island (see Figure 3, Harding, Arch, and Shag Rocks). According to the Harbor Safety Committee, although inbound vessels travel south of Alcatraz, ships with a draft exceeding 38 feet, including heavily-loaded container ships, commonly sail north of Alcatraz in the outbound lane in order to sail in the deeper waters north of the Island and to avoid small craft that normally congregate south of the Island. This routing brings the deep draft ships close to Harding, Arch, and Shag Rocks and presents a navigational safety issue. Although the rocks were lowered a number of years ago, they are, the Harbor safety Committee believes, too close to the Bay surface for safe passage of modern deeper draft vessel traffic, and should be lowered. If they were lowered to 55 feet depth as recommended by the Harbor Safety Committee, the Committee recommends that a new two-way navigation lane north of Alcatraz Island be established.¹⁹ The Harbor Safety Committee has referred its recommendation to the Corps for analysis. The Corps is studying the proposal, analyzing the scale of the project, cost, and environmental effects. At the conclusion of its analysis, it will make a decision whether or not to proceed with a more in-depth analysis that could lead to lowering the rocks.

Conclusions

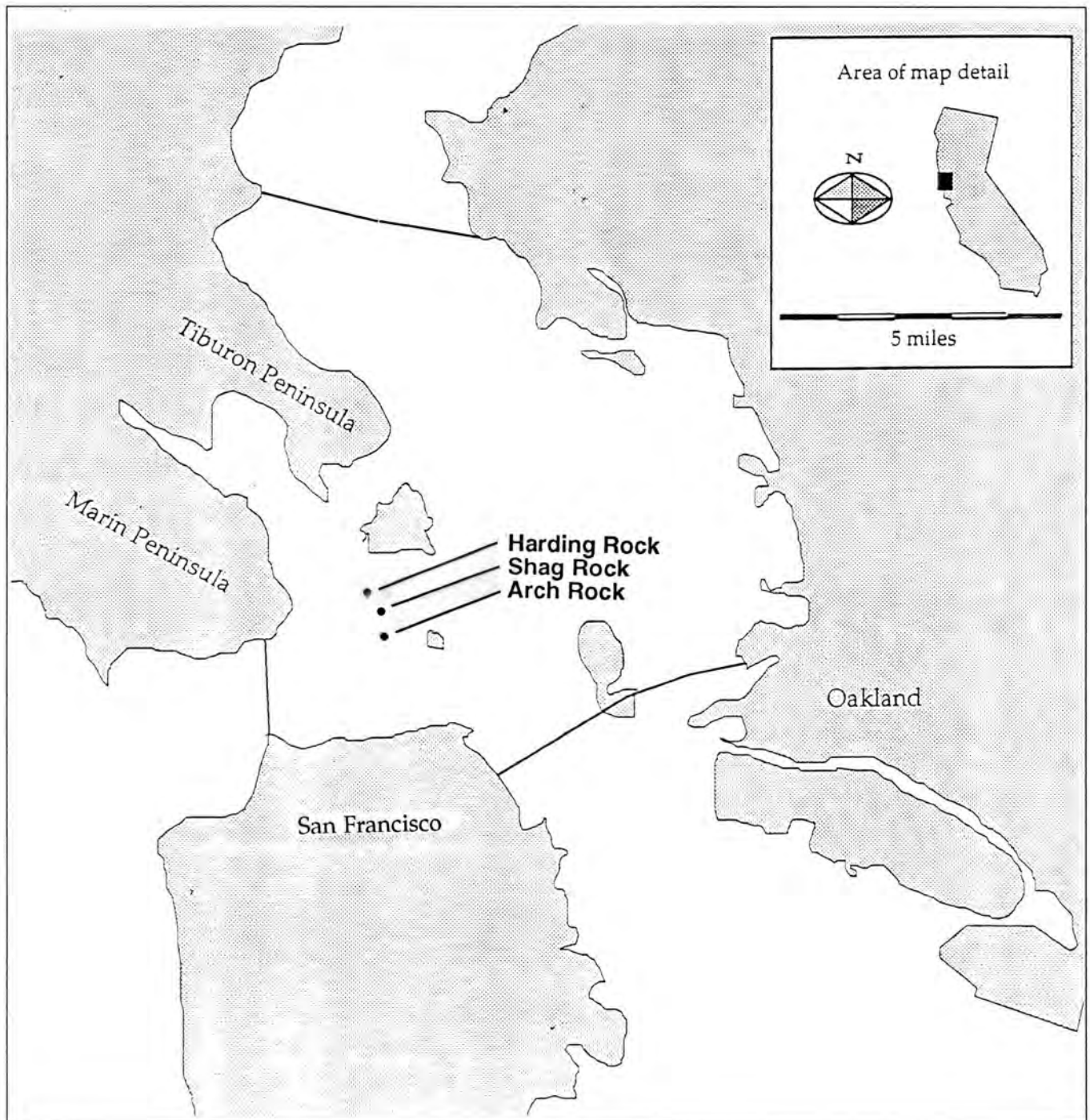
1. Sufficiently deep, wide, and well maintained navigation channels are essential to the operation of Bay Area ports. Historically, sediments excavated from the Bay to either maintain or deepen navigation channels were disposed back in the Bay. However, federal and state regulatory and dredge management agencies have significantly limited the locations, amount, and timing of Bay dredging and dredged material disposal.

2. The volume of sediment scheduled to be dredged in the future to deepen and maintain existing navigation channels, turning basins, and ship berths—even with the closure of Bay military bases—will exceed, particularly in years of high riverine inflows to the Bay, the annual sediment disposal volume limits currently set by the regulatory agencies. The LTMS, established to develop a long-range dredging and dredged material disposal management plan and implementation program for the Bay, will identify alternative sites to Bay disposal for the dispose of dredged material, including sediments that do not meet Bay aquatic disposal standards. As part of the LTMS, the EPA is expected to designate a deep ocean disposal site in mid-1994 and the BCDC is expected to identify a range of upland sites for the beneficial use of disposed dredged materials.

3. Transporting dredged sediments to the deep ocean site or upland sites will be more expensive—in some cases considerably more expensive—than historical costs of disposing in the Bay. Nonetheless, alternate sites to Bay disposal should be available for the disposal of sediments dredged to maintain and deepen Bay navigation channels and port facilities. Moreover, some of the dredged sediments can be disposed at certain upland locations where the material can be used for additional regional public benefits, for example, for wetland and wildlife habitat restoration and management and levee maintenance and repair. The alternative of using dredged material for beneficial uses at upland sites is new, and there are several constraints to overcome, such as additional cost, institutional reluctance, and hesitancy and fear of the unknown environmental effects of such projects. Nonetheless, alternatives to disposal of dredged materials in the Bay, in addition to limited Bay disposal, should provide an adequate range of disposal options to enable dredging to maintain, and where necessary, deepen, Bay navigation channels and port berthing facilities.

¹⁹ Harbor Safety Committee of the San Francisco Bay Region. *San Francisco, San Pablo and Suisun Bays Harbor Safety Plan*, (San Francisco: Harbor Safety Committee of the San Francisco Bay Region, August 13, 1992), pp. 23-25.

Figure 3

Harding, Arch, and Shag Rocks Location

4. The cost of sediment disposal can be reduced if the amount of material dredged is kept to the minimum amount necessary. Therefore, in the marine terminal designation evaluation phase of the review of the *Seaport Plan*, the Seaport Planning Advisory Committee should look closely at the utility of providing, deepening and maintaining navigation channels, turning basins, and ship berths at each of the port priority use and marine terminal sites—including military bases—designated in the *Seaport Plan*. Dredging practicability and cost should be criteria in determining what changes, if any, should be made to the *Seaport Plan* port priority use and marine terminal designations.

5. The LTMS will not be completed until 1995, and therefore the LTMS recommendations concerning dredging and the disposal of dredged material—which could greatly effect port planning—are unknown. Because the annual capacity of Bay dredged material disposal sites is limited and the trend has been to narrow the opportunities for Bay disposal, it is possible that the LTMS will recommend a different mechanism for allocating disposal of dredged sediments in the Bay. The new allocation mechanism could take the form of a priority system whereby the dredging project(s) that provided the greatest economic benefit to the region would have priority for disposal over the other proposed projects. Another method that might be considered is an auction system wherein the right to dispose of a certain quantity of dredged sediments would be auctioned to the highest bidder and disposal rights could be bought and sold. The LTMS could also determine that only sediments from maintenance dredging should be disposed in the Bay and that all new project dredging, that normally consists of heavy, consolidated sediments, should be disposed in the ocean or at an upland site. The Seaport Planning Advisory Committee and the ports should be prepared to discuss these alternatives and make their views known to the LTMS.

6. The Seaport Planning Advisory Committee should follow the Corps' progress on its analysis of the feasibility and desirability of lowering Harding, Arch and Shag Rocks to a sufficient depth to provide safe navigation for modern, deeper draft ocean-going vessels and the establishment of a two-way navigation lane north of Alcatraz Island as recommended by the Harbor Safety Committee of the San Francisco Bay Region. If the Corps determines that the rocks can be lowered in an environmentally sound manner and recommends that they should be lowered, the Seaport Planning Advisory Committee should support the Harbor Safety Committee's and the Corps' recommendations.

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